ENERGY STAR® Program Requirements for Residential Ceiling Fans

Eligibility Criteria – Version 2.0

FINAL DRAFT

Below is the **FINAL DRAFT** product specification (Version 2.0) for ENERGY STAR qualified residential ceiling fans. A product must meet all of the identified criteria to earn the ENERGY STAR.

1) **Definitions:** Below are the definitions of the relevant terms in this document.

   A. Residential Ceiling Fan: A non-portable device designed for home use that is suspended from the ceiling for circulating air via the rotation of fan blades. Some ceiling fans also have an integral or attachable light kit.

   B. Light Kit: A complete lighting unit consisting of a lamp or lamps, and ballasting (when applicable) together with the parts designed to distribute the light, position and protect the lamps, and connect the lamps to the power supply. Light kits can be:

      - Integral – the light kit is attached to the ceiling fan housing at the time of purchase. This type of a light kit is integrated into the bottom cap of the fan and cannot be removed or replaced with another light kit.

      - Attachable – the light kit is not, at the time of sale, physically attached to the fan. The light kit must be attached to the ceiling fan for the lights to work. Attachable light kits might be included inside the ceiling fan box at the time of sale or sold separately for subsequent attachment to the fan.

   C. Controls: Controls enable the user to turn on/off or adjust the lighting and fan movement. Controls may be in the form of pull chain, slide switch, wall switch/panel, or remote control.

   D. Airflow: The rate of air movement at a specific fan setting expressed in cubic feet per minute (CFM). Airflow is determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

   E. Airflow Efficiency: The ratio of airflow divided by power at a specific residential ceiling fan setting expressed in CFM per watt (CFM/watt). Airflow and power are determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

   F. Power Consumption: Defined as the active power and expressed in watts. Power consumption is measured during residential ceiling fan testing at a specific speed using the test procedure described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

   G. Standby Mode: The lowest power consumption mode which cannot be switched off, or influenced, by the user and that may persist for an indefinite time when the ceiling fan is connected to the main electricity supply and used in accordance with the manufacturer's instructions. Standby mode is a non-operational mode when compared to the intended use of the ceiling fan's primary function; moving air and providing light (when applicable). Energy consumed by a motion sensor, remote control, or other standby device which continues to draw power during fan inactivity,

should be included when measuring standby power consumption. Standby power is measured in watts.

H. Solid State Test Method: A test method that specifies the apparatus and testing protocol for measuring a residential ceiling fan's airflow and power consumption. The method utilizes a hot-wire anemometer and requires a temperature controlled room and computer for recording test data.

I. Hugger Fan: A fan style where the motor mounts directly to the ceiling. Hugger fans are most commonly used in rooms with low ceilings. Hugger fans are manufactured and marketed as such and should not be confused with multi-mount (traditional) fans that can be hung without the down rod, giving the same effect as a hugger fan. Hugger fans are designed to allow installations on 7'6" – 8' height ceilings when using a fan light kit in a location where walking under the fan will occur.

Note: EPA has not received any comments on the new Hugger Fan definition proposed in the Draft 1 specification. **Stakeholders with final comments on this revision must provide feedback by August 22, 2003 to be considered for the Final Version 2.0 specification.**

2) **Qualifying Products:** In order to qualify as ENERGY STAR, a residential ceiling fan must meet the definition in Section 1A and the specification requirements provided in Sections 3 through 7, below. Ceiling fan light kits, integral and attachable, must meet the definition in Section 1B and the requirements provided in Sections 3B, 6, and 8, below. Hugger fans cannot qualify as ENERGY STAR under this Version 2.0 specification.

3) **Performance Specification and Lighting Requirements for Qualifying Products:**

A. Airflow Efficiency

Qualifying products shall meet or exceed the following minimum requirements for total airflow and airflow efficiency when operating in a downward-blowing direction. Models sold with light kits or integrated light sources must be tested with those light sources mounted in their intended position and switched off. The representative models' measured performance may vary by 5 percent of the performance levels provided in Table 1, below, at the time of testing and still be deemed compliant with this specification. These test results may then be used to represent the performance of all individual units sold under the same model name and number. Each individual unit must perform within 5 percent of the tested representative model to be compliant with this specification.

As of **October 1, 2004**, all tested representative models must meet the minimum requirements listed in Table 1, below, without the assistance of the 5 percent tolerance at the time of testing. Once a representative model has qualified as ENERGY STAR, all additional units manufactured under the same model name/number, and found in the distribution channel (i.e., retail), must perform within 5 percent of the tested performance levels submitted to EPA and listed on the ENERGY STAR Web site.

Table 1 –Air Flow Efficiency Requirements

Fan Speed	Minimum Airflow	Efficiency Requirement
Low	1,250 CFM	155 CFM/watt
Medium	3,000 CFM	100 CFM/watt
High	5,000 CFM	75 CFM/watt

Note: As mentioned in the Draft 1 specification, performance requirements for additional fan sizes (i.e., 36", 44", etc.) will not be included in the Version 2.0 specification. However, EPA has received some interest from the manufacturers to address additional fan sizes. It is not EPA's intention to delay the finalization of this Version 2.0 specification, however, given continued interest and available data, EPA may address this topic in future revisions.

The Draft 1 specification proposed an increase to the medium speed CFM requirements from 2,500 to 3,000 CFM and change in CFM/watt requirement from 110 to 100 CFM/watt, respectively. EPA's intention behind this revision is to offer qualified models that provide enough airflow so that the consumer chooses to set the fan on the medium speed rather than the high speed, thus using less energy. EPA has not received any comments from manufacturers challenging these proposed CFM and CFM/watt requirements.

Following the release of the Draft 1 specification, it was brought to EPA's attention that a clarification should be made regarding the proposed elimination of the 5 percent tolerance, which would take effect on October 1, 2004. Currently a representative fan model may qualify as ENERGY STAR as long as it performs within 5 percent of the minimum CFM and CFM/watt requirements when tested. Under the new Version 2.0 specification, this 5 percent testing tolerance will be eliminated, effective October 1, 2004. Representative models that test below these levels will not qualify as ENERGY STAR. However, ceiling fan models manufactured and sold based on the representative model design may test within 5 percent of the reported CFM and CFM/watt claims and still qualify as ENERGY STAR.

Models qualifying under the Version 1.1 specification may continue to carry the ENERGY STAR mark through the distribution channel but cannot be promoted as ENERGY STAR. All models manufactured on or after October 1, 2003, must meet the new performance requirements presented in this Version 2.0 specification. Those products that do not initially meet the new requirements, must be re-tested and re-submitted to remain qualified as ENERGY STAR.

Many ENERGY STAR partners are designing their fans in preparation of this new requirement and to date, EPA has not received any comments from industry members challenging the elimination of the 5 percent testing tolerance. **Stakeholders with final comments on the elimination of the 5 percent testing tolerance and new medium speed requirements must provide feedback by August 22, 2003 to be considered for the Final Version 2.0 specification.**

This specification defines residential ceiling fan airflow efficiency on a performance basis: CFM of airflow per watt of power consumed by the motor and controls. This treats the motor, blades, and controls as a system, allowing multiple approaches to reach a given efficiency level. Efficiency is to be measured on each of three fan speeds (low, medium, high) using the "Solid State Test Method," which is explained in more detail in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

For those ceiling fan models that offer more than three speeds (e.g., low, medium, high), manufacturer may choose the three individual speed settings that should be used to comply with the performance levels set forth in Table 1. However, at the time of testing measurements should be taken and reported for all discrete operating speeds. If more than three speeds are listed in the Performance Table, required in Section 7 of this specification, manufacturer should indicate which speeds qualify as ENERGY STAR.

B. Lighting

All integral and attachable light kits must meet the requirements of the ENERGY STAR Residential Light Fixture specification. Similarly, attachable light kits, sold separately, must also meet the requirements of the residential light fixture specification. Partner should use the Ceiling Fan Qualified Product Information (QPI) form to report qualifying light kits. Visit the ENERGY STAR Web site at www.energystar.gov/partners, to review and download the Residential Light Fixtures Program Requirements.

Qualifying residential ceiling fans sold without integral or attachable light kits must provide information on product packaging or with product instructions regarding ENERGY STAR qualifying light kits that may be used with that particular residential ceiling fan.

4) **Controls:** Qualifying products shall permit convenient consumer adjustment of fan speed. This may be accomplished by means of one or more wall-mounted switch(es), a remote control, or readily accessible pull chains. For purposes of this specification, "readily accessible" shall be defined as a length sufficient to reach a height of no more than 80 inches (203 cm) above the floor when the residential ceiling fan is mounted according to the residential ceiling fan's installation instructions. For those residential ceiling fans that can accommodate light kits, the lights and the fans must be able to be controlled separately, allowing users to switch off lights during fan operation or operate the lights without using the residential ceiling fan.

   Qualifying products shall also provide for consumer adjustment of airflow direction (upward or downward) by one of the following means:

   - A vertically or horizontally mounted slide switch on the motor housing. For vertically mounted switches, the downward position must correspond to downward airflow. For horizontally mounted switches, airflow direction must be clearly identified on the switch housing or within the product literature.
   - A wall-mounted switch
   - A remote control
   - A readily accessible pull chain

5) **Sound:** No requirements at this time.

> **Note:** There will be no sound requirements in the Version 2.0 specification. Currently, there is no testing standard or procedure specifically developed for ceiling fans. However, EPA continues to be interested in the development of a potential test procedure and minimum sound requirement. In addition, a number of manufacturers have expressed their interest in requiring minimum sound levels in the specification and its importance to consumer perception of an ENERGY STAR qualified ceiling fan. In the near future, EPA will work with participating laboratories, manufacturers, and other members of industry to conduct research and determine whether or not a test procedure can be developed and a minimum performance level included in future revisions of the specification.

6) **Warranty:** Qualifying products shall provide a warranty of at least 30 years for the motor and at least one year for all other components of qualifying residential ceiling fans. Residential ceiling fans sold with integral light kits also shall meet applicable warranty requirements under the ENERGY STAR Residential Light Fixture specification.

Note: Partners are expected to comply with the lighting warranty set forth in the ENERGY STAR Residential Light Fixtures specification, in effect at the time of qualification. Currently, there is a 2-year requirement for ENERGY STAR qualified light fixtures; therefore all ceiling fan light kits must also meet this 2-year warranty. Please note that the residential light fixture specification could be revised in the future and all qualified light kits would need to comply with the new requirements, as applicable. If there are changes made to the required lighting warranty, partners will be notified and these changes will be reflected in the ceiling fan Qualified Product Information (QPI) form.

7) **Consumer Information:** In addition to the ENERGY STAR logo, packaging of ENERGY STAR qualified residential ceiling fan models shall also state airflow, fan power consumption, and airflow efficiency at each of their three operating speeds, as determined by the test procedures specified in Section 3A, Airflow Efficiency. If the ceiling fan model offers more than three speeds, performance results should be provided for all speeds on the packaging, indicating which three speeds were used to qualify the fan as ENERGY STAR. This information shall appear in the following form on the outside portion of the package:

Fan Speed	Airflow	Fan Power Consumption (without lights)	Airflow Efficiency (higher is better)
Low	__ CFM	__ watts	__ CFM/watt
Medium	__ CFM	__ watts	__ CFM/watt
High	__ CFM	__ watts	__ CFM/watt

Product operating and installation instructions shall include a short list of standardized information regarding how to operate the products efficiently. This list shall include, at a minimum, information about the following topics:

- adjusting fan speed and direction for season and room occupancy to maximize energy savings
- HVAC thermostat adjustment for energy savings when a ceiling fan is in use
- proper mounting distance from the ceiling to maximize efficient operation
- how to find proper replacement lamps for the light kit, if included

8) **Testing and Reporting Procedures:** Manufacturers are required to perform tests and self-certify each representative model that they intend to qualify as ENERGY STAR. In performing these tests, laboratories must use the test method described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*. When testing ceiling fan light kits, manufacturers must meet the testing and documentation requirements included in the ENERGY STAR Residential Light Fixture specification.

A. Laboratory Testing

Under this specification, ceiling fans may only be tested by those laboratories who meet the guidelines provided in EPA's ENERGY STAR Testing Facility Guidance Manual and have been approved to test for ENERGY STAR qualification. EPA will conduct annual "round-robin" testing of these laboratories (i.e. calibrations), to verify that test results fall within +/- 5 percent of each other. This process will be performed using a reference fan provided by EPA. Laboratories that can test and qualify ceiling fans under ENERGY STAR, can be downloaded from the ENERGY STAR Web site at www.energystar.gov/partners. Additional direction regarding the laboratory calibration procedure is provided in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

Note: The protocol for laboratory calibrations was to test one representative fan within 3 percent while running the fan at a constant RPM of 200. However, for the first round of annual calibrations, EPA and the participating testing laboratories decided to calibrate at each of the three speeds to better emulate the ENERGY STAR qualification process at low, medium, and high settings. Although all existing laboratories came within 3 percent of each other during initial calibrations one year ago (at 200 RPM), this tolerance was more difficult to meet when the RPM is not held constant. However, EPA does feel that this is the more appropriate calibration method to use for the round-robin testing. Therefore, for purposes of the annual round-robin calibrations, all participating laboratories must test within 5 percent of each other. New laboratories will continue to initially calibrate within 3 percent of an existing laboratory when tested at 200 RPM. EPA is continuing to work with all of the participating laboratories in an attempt to strengthen the test procedure and narrow this tolerance percentage.

B. Reporting Requirements

The company whose brand name appears on the product packaging shall, for purposes of this specification, be considered the manufacturer. Manufacturers must complete a QPI form when submitting qualified products to EPA. This form must be accompanied by reports from a qualified laboratory containing airflow, power consumption, airflow efficiency data, and lighting test results (where applicable) for each residential ceiling fan model and light kits proposed for qualification. Families of residential ceiling fan models that are identical in every respect but finish may be qualified through submission of test data for a single representative model. Likewise, models that are unchanged or that differ only in finish from those sold in a previous year may remain qualified without the submission of new test data, assuming the specification remains unchanged. However, separate test data are required for all models that differ in any of the following characteristics:

- motor type or size
- rotational speed
- control type (if included with fan)
- blade weight, number, size, or pitch
- housing (i.e., size, design, ventilation)

C. Product Performance Review Process

To the extent ENERGY STAR is a self-certification program, EPA relies on the integrity of participating companies to ensure all products for which ENERGY STAR claims are made, meet all aspects of the ENERGY STAR performance specification. When mistakes are made and products are mislabeled or fail to perform as expected, EPA is committed to ensuring prompt corrective action.

In the event EPA is provided test data or other product information indicating a performance problem or mislabeling situation, EPA will take the following steps:

1. Inform the product manufacturer about the apparent performance and/or labeling problem.
2. Ask the product manufacturer to withdraw the product (i.e. model number) from the ENERGY STAR qualified product list and stop labeling -OR- affirm the basis for qualification by supplying any relevant test data not already provided.
3. In the event that a definitive conclusion cannot be reached based on the manufacturers response, EPA will make every effort to test the product in question as part of its in-use screening initiative.
4. If EPA concludes, based on testing performed on behalf of EPA (or an independent entity such as Program for Evaluation and Analysis of Residential Lighting, PEARL) in accordance with the ENERGY STAR specified test procedure, that the product in question does not fully qualify with the ENERGY STAR performance criteria, the product manufacturer will be asked to provide a

"corrective action" plan to EPA outlining the process by which the product will be modified and retested so that qualification with the specification will be demonstrated within 90 days. If the product manufacturer fails to submit a corrective action plan or exceeds the deadline for implementing it, the product in question will be removed from the Qualified Product List on the ENERGY STAR Web site.

Note: The challenge language has been revised to be more consistent with EPA's approach toward other ENERGY STAR product categories.

9) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR, under the Version 2.0 specification, will be defined as the *effective date* of the agreement. The ENERGY STAR Residential Ceiling Fan (Version 2.0) specification shall go into effect on **October 1, 2003**. Any previously executed agreement on the subject of ENERGY STAR qualified residential ceiling fans, shall be terminated effective October 1, 2003.

   A. Qualifying and Labeling Products Under the Version 2.0 Specification: All products, including models originally qualified under Version 1.1, with a **date of manufacture** on or after **October 1, 2003**, must meet the Version 2.0 requirements in order to bear the ENERGY STAR mark on the product or in product literature. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.

Note: In an attempt to simplify the ceiling fan specification, all references to Tier I and Tier II have been removed. Those elements of the specification that continue to have additional "Tier II" requirements, are now represented by effective dates that are specific to that requirement.

As of October 1, 2003, all models that qualify under the current Tier I specification, but do not meet the new Version 2.0 requirements, must be retested and resubmitted to remain qualified as ENERGY STAR.

   B. Elimination of Grandfathering: EPA will not allow grandfathering under this Version 2.0 ENERGY STAR specification. **ENERGY STAR qualification under Version 1.1 is not automatically granted for the life of the product model.** Therefore any product sold, marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current specification in effect at that time.

Note: Under Version 2.0, EPA has made a significant change with regard to product qualification and labeling during specification transitions. EPA has made this important programmatic change for two reasons:

1. To deliver on expectations about ENERGY STAR by ensuring that the products perform at levels promised by the program.
2. To ensure that ENERGY STAR's ability to differentiate more efficient products is not undermined by high percentages of labeled products qualifying at less stringent performance levels.

10) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions.